

## Integrating Gender and Nutrition within Agricultural Extension Services

Case Studies and  
Discussion Paper  
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# The Integration of Nutrition into Agricultural Training Institutions

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### Key Terms

#### **Nutrition-sensitive**

**agriculture:** It is an approach to agricultural development that puts nutritionally rich foods, dietary diversity, and food fortification at the heart of overcoming malnutrition and micronutrient deficiencies. This approach stresses the multiple benefits derived from enjoying a variety of foods, recognizing the nutritional value of food for good nutrition, and the importance and social significance of the food and agricultural sector for supporting rural livelihoods.

**Agricultural Extension and Advisory Services:** the entire set of organization that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills and technologies to improve their livelihoods (Anderson, 2007).

This definition includes organizations from different governmental agencies (formerly the main actors in

### Executive Summary

Rising global rates of malnutrition suggest a great need for building sustainable and nutrition-sensitive food systems that will eradicate hunger and promote healthy diets. To accomplish this, nutrition must be incorporated at all levels of the value chain, including farmers producing more nutritious food with the assistance of nutrition-sensitive agricultural extension and advisory service (EAS). Agricultural extension and advisory workers (EAWs) are key transmitters of agricultural knowledge to farmers; hence, including nutrition in their mandate, and training them for it, could improve farm households' production, livelihoods and overall wellbeing. Very few post-secondary agricultural training institutions (ATIs) have integrated nutrition into their pre-service agriculture extension curricula. Therefore, the curricula provided to current and future agricultural extension agents must be revisited.

This document addresses the nutrition capacity development training gap for agricultural EAS by sharing experiences of nutrition integration in four countries: Burkina Faso, Ethiopia, Zambia and India. Each case highlights a context-appropriate approach, whether it is the development of a stand-alone nutrition course, or nutrition modules incorporated in agricultural courses or a mix of the two configurations. Despite their geographical diversity (Asia, East Africa, South Africa and West Africa) and differences among the specific/predominant nutritional challenges each country encounters, commonalities emerge. These commonalities can be grouped into a seven-step process with two important pre-existing conditions: the window of opportunity and an enabling political environment. The steps identified are: i) establish a work group; ii) assess learning needs; iii) develop nutrition content; iv) revise curriculum; v) validate with stakeholders; vi) implement the integrated nutrition content; and finally, vii) monitor, evaluate and improve/revise.

extension), non-governmental organizations (NGOs), producer organizations and other farmer organizations, and private sector actors including input suppliers, purchasers of agricultural products, training organizations, and media groups (Davis, 2008).

**Rural advisory and extension services**, are all the different activities that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organizational, and management skills and practices so as to improve their livelihoods and wellbeing. (Christoplos, 2010)

**Agricultural Extension** has been strictly defined as the application of scientific research, knowledge, and technologies to improve agricultural practices through farmer education. (UIUC, UCD, UF, CP, 2016)

**Agricultural training institutions:** In this paper when referring to ATIs, only post-secondary agricultural training institutions are concerned.

**Nutrition content:** include stand-alone course or a nutrition module, unit or chapter in an agricultural course.

## Acronyms and Abbreviations

ATI	Agricultural Training Institute
BMEL	German Ministry of Food and Agriculture
CAP-M	Mantourkou Agricultural Polyvalent Center ( <i>Centre Agricole Polyvalent de Mantourkou</i> )
EAS	Extension and Advisory Services
EAW	Extension and Advisory Worker
ENACT	Education for Effective Nutrition in Action
ENAF	Education for Effective Nutrition in Francophone Africa
ENEF	National School for Water and Forestry ( <i>École Nationale des Eaux et Forêts</i> )
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FFLS	Farmer Field and Life Schools
FFS	Farmer Field Schools
GNR	Global Nutrition Report
ICN2	Second International Conference on Nutrition
INGENAES	Integrating Nutrition and Gender within Agricultural Extension Services
IRD	Institute of Rural Development
LNA	Learning Needs Assessment
MFL	Ministry of Fisheries and Livestock
MoA	Ministry of Agriculture
MoH	Ministry of Health
NCD	Non-Communicable Disease
NFNC	National Food and Nutrition Commission
NRDC	Lecturers at the Natural Resources Development College
PEP	Performance Enhancement Programme
PROGEO	Planning and Resource Guide for Agricultural Extension Officers
SAFANSI	South Asia Food and Nutrition Security Initiative
SDGs	Sustainable Development Goals
SOFA	State of Food and Agriculture in the World
SUN	Scaling Up Nutrition Movement
UNB	<i>Université Nazi Boni, Bobo Dioulasso</i>
USAID	United States Agency for International Development

## Background

As the nutrition agenda has gained momentum worldwide, a growing number of multilateral actors have intensified efforts to design strategies to fight hunger and prevent all forms of malnutrition. Despite significant investments in addressing undernutrition, an alarming trend has been revealed: world hunger is on the rise after years of decline. For the first time in a decade the number of people going to bed hungry is increasing again. The number of chronically undernourished people increased to 815 million in 2016 from 777 million in 2015. Globally, roughly one out of four children under the age of five years is stunted; wasting threatens the lives of almost 52 million children; and almost one-third of women of reproductive age worldwide suffer from anemia. Overweight and obesity are reaching unprecedented levels worldwide: in 2016, 41 million children under five years were overweight. Adult overweight and obesity is rising everywhere: more than 1.9 billion adults are overweight, and among them 600 million suffer from obesity (FAO, 2017). Multiple forms of malnutrition coexist within countries, households, and even individuals as they simultaneously experience combinations of high rates of undernutrition, micronutrient deficiencies (also known as hidden hunger) and obesity. In 2016, 88% of countries were facing the burden of multiple forms of malnutrition (Development Initiatives, 2017).

Because there is a greater need today for a common vision for global action to eradicate hunger and end malnutrition, several global commitments have emerged: The Scaling Up Nutrition Movement (SUN) commenced in 2010, and the Second International Conference on Nutrition (ICN-2) in November 2014 outlined various policy recommendations for re-designing sustainable food systems to advance optimal nutrition. In April 2016, recognizing poor nutrition as an impediment to development, world leaders specifically dedicated the 2<sup>nd</sup> Sustainable Development Goal (SDG 2) of the transformational 2030 Agenda to nutrition, while at least 12 of the 17 Goals contain indicators that are highly relevant to improving nutrition outcomes. To accelerate the implementation of the Framework for Action of the ICN-2 and the achievements of nutrition related SDGs, the 71<sup>st</sup> United Nations Assembly proclaimed 2016-2025 as the United Nations Decade of Nutrition Action to mobilize support to eradicate malnutrition in all countries through sustained and coherent implementation of policies and programs.

These combined efforts (figure 1) place nutrition firmly at the heart of the sustainable development agenda with the recognition that transformed food systems have a fundamental role to play in promoting healthy diets and fighting malnutrition. This ambition can only be fulfilled if agriculture and food systems become sustainable, so that food supplies are stable and all people have access to adequate nutrition and health.

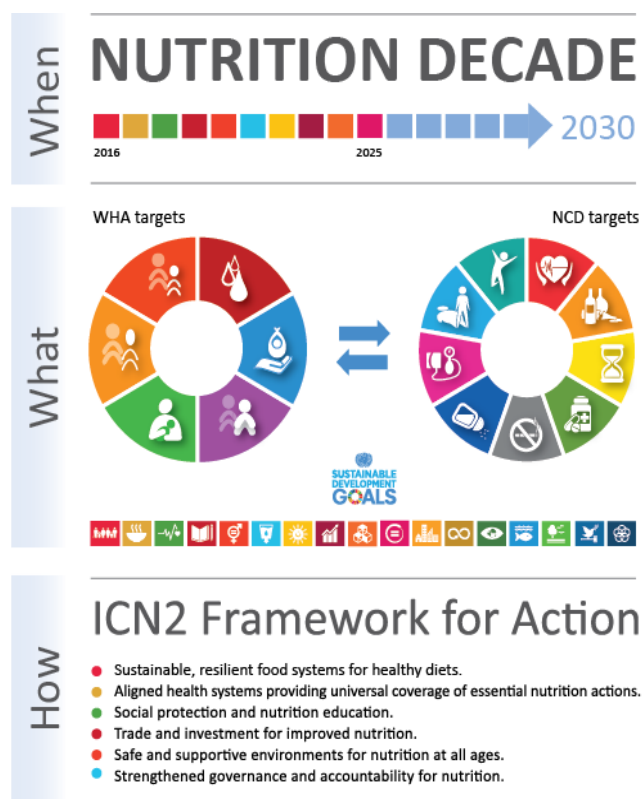


Figure 1: ICN2 Framework for Action  
Source: (UNSCN, 2018)

The agriculture sector is essential in transforming the entire food system. The overall objective of nutrition-sensitive agriculture (defined in box 1) is to equip the global food system to produce good nutritional outcomes. For this, nutrition must be incorporated into all aspects of the value chain.

In 2017, the United Nations Food and Agriculture Organization (FAO) flagship publication, the State of Food and Agriculture (SOFA), concluded that fulfilling the 2030 Agenda depends crucially on progress in rural areas, which is where most of the world's poor and hungry live. Rural transformations in many countries have led to an increase of more than 750 million in the number of rural people living above the poverty line. One strategy to achieve the same results in the countries that have been left behind would be to boost agricultural/food production by small-scale farmers (FAO, 2017). Strengthening the nutrition-related capacity of small-scale farmers and other value chain actors can enable them to produce and market more nutritive foods. Important transmitters of agricultural knowledge to farmers are agricultural extension and advisory workers (EAWs). Agricultural extension and advisory services (EAS) provide critical services that improve the productivity and livelihoods of smallholder farmers and enable them to maximize their contributions to national and global development (FAO, 2017).

Although there is little published evidence on the impact of strengthening capacities of agriculture extension and advisory workers and farmers' eating habits and improved nutrition status, Larsen and Lilleør (2015) found in their study in Northern Tanzania that agricultural interventions can influence the underlying determinants of undernutrition to such an extent that they translate directly into children coming closer to their full growth potential (Larsen & Lilleør, 2015). Kuria (2014) found that farmers participating in a Kenyan Farmer Field and Life School (FFLS) project that addressed nutrition consumed more meals than before joining the FFLS project (Kuria, 2014). An assessment conducted in Senegal where farmers received nutrition training through Farmer Field Schools highlighted improved meal frequency and dietary diversity, with 94% of the children daily consuming at or above the recommended four food groups (Dia, Sablah, & Ag Bendeche, 2017). Hence, including nutrition in the agenda of EAS could be beneficial in improving farmers' and their families' nutritional status. As of today, disseminating nutrition-sensitive agricultural knowledge is generally not an activity conducted in EAS, but there is great potential for integrating it through the networks of agriculture extension and advisory workers.

The studies mentioned above indicate that preparing EAWs, either through in-service training or pre-service training, to deliver nutrition-sensitive message could have a positive effect on the underlying determinant of nutrition. Dia, Sablah and Ag Bendeche (2017) conducted a literature review in the Africa region revealing that while some in-service training manuals have integrated nutrition, none of the post-secondary agricultural training institutions (ATIs) in the sample had integrated nutrition into their pre-service agriculture extension program (Dia, Sablah, & Ag Bendeche, 2017). Findings that were confirmed by Ruppert and Castellanos (2017) (Ruppert & Castellanos, 2017). One way to achieve this is to align the curricula provided to current and future agricultural extension agents with nutrition objectives (Suresh, et al., 2016).

This document shares experiences that have emerged since the preceding publications and proposes a guide for the development of adapted nutrition content in agricultural-focused post-secondary training curricula. Due to the dearth of evidence and materials published on this topic, this paper offers a very first attempt to formalize, structure and harmonize a process that is already on-going in several countries, acknowledging that the process might require adjustments with the development of further experience and evidence. Its guidance reflects key elements that proved to be successful to the development and integration of a context-adapted nutrition content in different settings (mainly in Africa and Asia) in the

past five years by various organizations (United Nations's agencies, non-governmental organizations, the government, etc.).

The primary audience is head of unit and teachers or government in charge of agriculture, food and nutrition security. The paper is divided into two main sections: the first shares experiences from four countries (Burkina Faso, Ethiopia, Zambia, India) related to their process of nutrition integration in the curricula of agriculture extension pre-service training, while the second section presents the key steps for the effective integration of nutrition content, and the development of adapted nutrition content, in an agriculture extension and advisory services program.

The purpose of this paper is threefold:

1. To **describe different experiences** of nutrition integration in the curriculum of post-secondary ATIs in low- and middle-income countries;
2. To **discuss the commonalities between the different experiences** in order to identify key steps for success;
3. To **highlight gaps that require further research** and experience in order to be resolved.

## Country Experience for Integrating Nutrition

This information for this section was collected via a desktop literature review and communication (face to face discussion, e-mail exchange and phone calls) with key informants<sup>1</sup>. Some country experiences are more developed than others due to availability of information and the variations in intensity of the processes conducted in respective countries. It is important to note that each country's process was unique and did not necessarily follow the same steps as that of the others.

### The Experience of Burkina Faso

The initiative for integrating nutrition in agricultural training institutions in Burkina Faso began in 2013 with the experience of the Agricultural Polyvalent Centre of Matourkou (Centre Agricole Polyvalent de Matourkou - CAP-M), the only public agricultural school, supported by the European Union (EU), the United Nations Children's Fund (UNICEF) and in partnership with the FAO and Helen Keller International. Since Sodjinou et al. (2016) has already well documented the CAP-M experience,<sup>2</sup> the case study in this paper will rather focus on the specific integration experience at the Institute of Rural Development of Université Nazi Boni in Bobo Dioulasso. The timeline of activities in Table I illustrates the integration process in CAP-M.

#### **Background: IRD and the ENACT/ENAF Opportunity**

One might assume that well-conducted agricultural and food security interventions would increase food productivity, leading to increased food availability, which would directly improve the nutritional status of targeted populations. But without including nutrition education interventions in the chain it is unlikely to

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<sup>1</sup> Key informants were: Prosper Sawadogo, FAO Nutrition Officer; Mesfin G. Abebe, Jphiego Ethiopia; Emily Burrows, formerly INGENAES Consultant in Zambia and Suresh Babu, Senior Research Fellow with IFPRI in Washington DC.

<sup>2</sup> Publication available at: <http://verizonaonlinepublishing.com/FnNPDF/FoodandNutritionReport12.pdf>

observe improved dietary habits and nutritional status (Girard, Self, McAuliffe, & Olude, 2012). Nutrition education consists of “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviors conducive to health and well-being.” (Contento, 2008). After understating the key role of nutrition education in promoting lifelong healthy eating habits and its contribution to sustainable food system, it was found that “nutrition education strategies within food security interventions were compromised by weak capacity at country level and only few countries were offering professional training in this field” (FAO, 2018).

**Table I : Timeline of activities: the case of CAP-M in Burkina Faso**

No.	Date	Title	Location	Number of participants	Objective
1	22 - 24 Feb 2012	ANSP inception workshop	Bamako, Mali		To allow all stakeholders to discuss the integration of nutrition into the training curricula of CAP/Matourkou and the key results to be achieved
2	12 - 15 Jul 2012	Orientation workshop	Banfora, Burkina Faso	28	To enable all stakeholders to have a common understanding about the nutrition mainstreaming process and the results to be achieved
3	15 - 17 Oct 2012	Identification of key nutrition topics	Matourkou, Burkina Faso	38	To identify key nutrition topics to add into the existing training curricula at CAP/Matourkou
4	13 - 15 Dec 2012	Curriculum revision	Banfora, Burkina Faso	32	To develop a teaching package for each of the courses or topics related to nutrition
5	04 - 05 Apr 2013	Validation workshop	Bobo-Dioulasso, Burkina Faso	55	To adopt curricula for implementation
6	26 - 30 Aug 2013	Training of faculty members in nutrition	Matourkou, Burkina Faso	27	To train teachers on the various aspects of nutrition
7	Nov 2013	Implementation of the new curricula	Matourkou, Burkina Faso		To train students with revised curriculum
8	28 - 29 Nov 2014	Monitoring of the implementation of the process	Farakoba, Burkina Faso		To discuss the implementation of the process and make recommendations for ongoing improvement

Source: (Sodjinou, et al., 2016)

Based on this observation, from 2010 to 2014, the FAO conducted need assessments of training in nutrition education in professional and academic contexts in twelve African countries: Benin, Botswana, Burkina Faso, Burundi, Cameroon, Egypt, Ethiopia, Ghana, Malawi, Niger, Nigeria and the United Republic of Tanzania. Findings of the assessment identified significant gaps in nutrition education training that could seriously undermine the positive impact of interventions in food security and nutrition. With the financial support of the German Ministry of Food and Agriculture (BMEL), FAO collaborated with seven African universities to develop the project “Education for Effective Nutrition in Action” (ENACT) in January 2012. ENACT’s objective was to develop and pilot a professional training course in nutrition education at undergraduate level for nutrition students, and to develop other materials to strengthen local capacity in planning, implementing and evaluating nutrition education and contribute to the reduction of food insecurity and malnutrition through behavior change in Africa.





ENAF students during an outside activity interviewing a group of women. Photo credit: Alain Hien

ENACT was expanded to francophone Africa by piloting the translated ENACT course in francophone African institutions and adapting it to the local context so as to integrate it in the regular university curricula. In francophone Africa we refer to the ENACT course as “Education for Effective Nutrition in Action in Francophone Africa” (ENAF). Whereas ENACT focused exclusively on improving nutrition education capacity amongst nutrition students, ENAF was piloted with agriculture students as well as nutrition students.

Among the universities selected to pilot the ENAF course were Université Nazi Boni (UNB) in Bobo Dioulasso<sup>3</sup> and its Institute of Rural Development (IRD). The ten-unit ENAF course was piloted at the IRD from December 2015 to April 2016 with 25 students from various agriculture specializations, namely: agronomy, agriculture extension, sociology and rural development, livestock and water and forestry. This case study draws solely on the experience of UNB in Burkina Faso

### Enabling political environment and nutrition champions

Burkina Faso demonstrated the political will to bridge the gap between agriculture and nutrition by adopting a national policy on food and nutrition security that included nutrition as a key component. The

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<sup>3</sup> Previously named: Université Polytechnique de Bobo Dioulasso

country also developed a nutrition-sensitive agriculture investment plan under the framework of the Comprehensive Africa Agriculture Development Program (CAADP).

Following a successful pilot phase, the two professors that piloted the ENAF course shared the results of the course at a scaling up workshop with key stakeholders from Bobo Dioulasso. The main recommendations from the workshop were: (i) to institute a pedagogical committee to envision the integration of a nutrition course into the curricula of UNB (not only IRD) in a timely manner; and (ii) to train two other tutors in each school of the UNB, and also of other agricultural schools of Burkina Faso (approximately 6-10 tutors in total). Then, UNB organized a two-day advocacy workshop to promote nutrition education and related capacity development throughout Burkina Faso. The workshop brought together more than 20 decision makers from sectors including agriculture, health, and education. The national advocacy workshop intended to clarify the nature and the need for nutrition education, and to advocate for better integration of nutrition education and training in nutrition education at national level. Together, these workshops convinced government and academia of the relevance of nutrition for agriculture interventions, a crucial first step to follow-on activities. Stakeholders fully supported establishing the pedagogical committee to develop a nutrition course that would fit the national academic context both in terms of content and academic credits.

### The Nutrition Integration Task Force: Pedagogical committee

The pedagogical committee was comprised of professors from three out of four rural development training institutions in Burkina Faso: 16 from UNB, two from the National School for Water and Forestry (*École Nationale des Eaux et Forêts - ENEF*), two from the Matourkou Agricultural Polyvalent Centre (*Centre Agricole Polyvalent de Matourkou - CAP-M*).

### Learning and Capacity Needs Assessment

FAO supported a national learning needs assessment in order to (1) identify what graduates do after graduation (e.g. are they all working in the rural development field?) and what was expected from the rural development agents by farmers, and (2) understand the capacity of ATIs to integrate a nutrition course in their curricula, in terms of financial implications, human resources, and time both for students and teachers. Results of the assessment were shared during a national learning needs and capacity assessment workshop in the presence of members of the pedagogical committee.

#### **Findings of the Needs Assessment**

Regarding the first objective of the assessment, it was found that the duration before finding a job in a relevant field was between 0 to 3 years and the main employers were: 1) the government, 2) private sector, and 3) non-governmental organizations and producer/farmer associations. In most countries the description of the roles, responsibilities and activities of agricultural EAWs is often ignored by producers/farmers. More importantly, there were no reference documents describing the roles, responsibilities and activities public EAWs are expected to perform.

As for the second objective, the capacity for institutions to integrate nutrition, it is not surprising that some conditions need to be filled: 1) strengthening human resources capacities in nutrition, either through training or through recruiting staff that meet nutrition competencies, 2) strengthening the material capacities of training institutions (i.e. fully functional tutoring room, etc.), and 3) increase the financial



incentives for teachers in relation with the integration of a nutrition content (as an additional responsibility).

According to participants, the workload of both students and teachers allow to add a nutrition course in the curricula. Most of the integration strategy proposed by the training institutions were a combination of theoretical courses, outside activities and internship on the field. According to participants the nutrition course should be integrated in all specialization (agriculture, livestock, forestry, environment, etc.) of the agricultural sector as a core course.



Teachers from the LNA workshop. Photo credit: A. D. Dioufouna

## Capacity Strengthening and Skills Need Assessment Workshop

This workshop also provided an opportunity to strengthen the capacity of the pedagogical committee in concepts of basic nutrition and nutrition-sensitive agriculture, and to start the process of identifying nutrition themes that would be covered in the nutrition course.

The skills need assessment was conducted as follows:

- Each agricultural specialization represented (agronomy, livestock, water and forestry, sociology and rural economy, agriculture extension and engineering biology) provided a list of activities that their agents usually carry out in the field. Some had clearly defined terms of references and other didn't.
- Participants worked to identify relevant nutrition actions corresponding to each identified rural development activity.
- Next, competencies and skills required for each nutrition action were identified.
- Finally, these competencies were regrouped in main themes that the nutrition course was built upon.

## Definition of Nutrition Modules' Themes and Content

Another two-week workshop with the pedagogical committee took place not long after the learning and skills need assessment to define in more detail the content of each theme, validate the first draft of the nutrition course and revise the curriculum of each specialization in UNB.

## 2018-2019: Year of Implementation

At the end of this process, the revised curricula were approved and validated by UNB authority and as of 2018, at UNB in Bobo Dioulasso, rural development agents are being trained in nutrition and the nutrition course is mandatory for all second-year students. Since students had just started to take the nutrition class at the time of this publication, there are no evaluation findings yet. But comments from professors and students are very encouraging so far.

**Table 2 : Timeline of activities: the case of IRD in Burkina Faso**

Date	Activity	Results
December 2015 to April 2016	Piloting of ENAF	<ul style="list-style-type: none"> <li>• Piloting was a success</li> <li>• 25 students trained in nutrition education</li> </ul>
June 2016	Scaling up Workshop	<p>Shared results of the course with key stakeholders</p> <p>Recommendations from the workshop:</p> <ul style="list-style-type: none"> <li>○ institute a pedagogical committee</li> <li>○ train two other tutors in each school of the UNB, and also of other agricultural schools of Burkina Faso (approximately 6-10 tutors in total)</li> </ul>
September – October 2016	Learning Needs Assessment	<ul style="list-style-type: none"> <li>• Collected data on the agricultural extension services situation and training in Burkina Faso</li> </ul>
November 2016	Advocacy workshop	<ul style="list-style-type: none"> <li>• Preliminary results of the LNA shared with 20+ multi sectoral decision makers and got their support</li> </ul>
	Institution of the pedagogical committee set up	<ul style="list-style-type: none"> <li>• Committee set up with teachers from the main ATIs in Burkina Faso under the leadership of IRD</li> </ul>
November 2017	Learning Needs Assessment and training workshop	<ul style="list-style-type: none"> <li>• Results of the LNA shared with training institutions</li> <li>• Trained 20 teachers from main ATIs on nutrition</li> <li>• Start defining the modules of the nutrition course</li> </ul>
December 2017	Module definition workshop	<ul style="list-style-type: none"> <li>• Defined detailed contents for the nutrition modules</li> </ul>
2018	Implementation	<ul style="list-style-type: none"> <li>• First generation of agricultural students from UNB took nutrition as a mandatory course</li> </ul>

## Case Study: Ethiopia

### The Context of Ethiopia and the ENGINE Project opportunity

Ethiopia joined the SUN Movement in September 2010, at a time when efforts to address the country's high rates of undernutrition were becoming more concerted. Ethiopia's National Nutrition Program (NNP) provides a strong mandate for involving the agriculture sector in efforts to improve nutrition. The USAID Ethiopia Empowering the New Generation to Improve Nutrition and Economic opportunities (ENGINE) project (2011-2016) was implemented by Save the Children in partnership with Jhpiego and other organizations. Jhpiego was responsible for supporting the development of the nutrition curriculum.

### Postsecondary Human Capacity Development

As a component of ENGINE's work to develop professional nutrition capacity, ENGINE collaborated with the NNP on activities that led to the development of a nutrition course to be included in the curriculum of Agricultural Technical Vocational Education and Training (ATVET) system. ENGINE initiated the process by engaging agricultural extension stakeholders to understand what they expected of graduates of the ATVET system who were transitioning to service as extension staff (known as "development agents" in the Ethiopian Agricultural Extension System).

### Competencies Inform Nutrition Content

Stakeholder input informed the development of nutrition core competencies, which were then compared with existing curriculum in order to ascertain which competencies were already included, and those that had yet to be addressed (JHPIEGO and Save the Children, 2012). A review of existing courses from across the plant and animal science curricula led to the identification of seven courses that were well positioned to deliver nutrition competencies. ENGINE and ATVET faculty with curriculum development expertise mapped the competencies to the courses, then trained instructors to deliver standardized nutrition modules in the context of their courses.

### Student Instruction and Achievement Gaps

ATVET instructed students using the revised courses, and in 2015 ENGINE undertook a representative survey that collected quantitative and qualitative data to assess student attainment of the nutrition core competencies, as well as their perceptions of their learning environment (Abebe, et al., 2017). Survey results revealed that although a majority of students demonstrated competencies at or above the minimum expectations, there was significant variation in student achievement based on demographic- and discipline-related factors. Plant science students achieved higher scores than their animal science peers, and older (>24 years of age) and male students were more likely to demonstrate the competencies than younger and female students.

### Curriculum Revision and Expansion

These findings led to a consultative process that engaged representatives from ATVET institutions, and the MoA determined that a separate course provided at specific and multiple points during student training be added to the curriculum. The focus on ATVETs was expanded to include universities with agricultural colleges.

The ATVET curriculum is revised centrally and not at the level of individual institutions. Given ENGINE's strong working relationships with federal curriculum specialists, the nutrition curriculum immediately became the national standard. A local project in four regions facilitated immediate roll-out of the curricula at the ATVET institutions in those regions, but implementation was delayed in other regions.

### Ongoing Systems Strengthening

At the conclusion of the ENGINE project, a consortium including Save the Children and JHPIEGO began implementing a five-year follow-on project called Growth through Nutrition. This project also includes a strong focus on human capacity development. Systems strengthening within post-secondary institutions includes developing the capacity of instructors who in many cases have little formal pedagogical training. Baseline data on student nutrition-related knowledge has already been collected. It is hoped that the combined efforts to revise the curriculum and improve educational quality will translate to better attainment of nutrition competencies.

The NNP mandate that agriculture be engaged in supporting nutrition enshrines the integration of nutrition in the curricula of both ATVETs and university-level agricultural training.

**Table 3 : Timeline of activities: the case of Ethiopia**

Date	Activity	Results
April 2012	Stakeholder engagement	<ul style="list-style-type: none"> <li>Stakeholders contributed their expectations for ATVET graduates/incoming extension staff</li> </ul>
December 2012	Development of nutrition competencies. Competencies informed by interviews and desk review of existing materials	<ul style="list-style-type: none"> <li>Expectations were distilled to identify core nutrition-related competencies for extension staff</li> </ul>
January-March 2013	ATVET Curriculum Review using add-on approaches	<ul style="list-style-type: none"> <li>Essential but missed nutrition content integrated to existing courses for plant and animal science cadres. Curriculum Revised</li> </ul>
June 2015	Students' nutrition sensitive agriculture competency assessed. Revisions implemented	<ul style="list-style-type: none"> <li>Mid-level agriculture cadres nutrition competencies improved, however it informed further revisions</li> </ul>
October–November 2015	Separate nutrition sensitive agriculture course developed and integrated to their curriculum	<ul style="list-style-type: none"> <li>Nutrition sensitive agriculture content enriched curriculum developed and implemented</li> </ul>

## Case Study: Zambia

### The Context of Zambia

The Republic of Zambia joined the Scaling Up Nutrition Movement in 2010, shortly after the release of the country's National Food and Nutrition Strategic Plan. Participation in the SUN Movement coincided with increased donor funding for nutrition activities, which heightened decision makers' awareness of the contribution of poor nutrition to the country's uneven progress in alleviating poverty. Nutrition-sensitive agriculture investments grew when USAID selected Zambia as a Feed the Future focus country in 2010, and the European Union (EU) embarked upon the Performance Enhancement Programme (PEP). PEP was designed to develop the capacity of the Ministry of Agriculture (MoA) and Ministry of Fisheries and Livestock (MFL) in order to support the Government of Zambia (GRZ) in achieving a dynamic national agricultural sector, improved rural livelihoods, and food security for all Zambians.

### Main Stakeholders' Engagement

The INGENAES project initiated activities in Zambia with a stakeholder meeting in March 2015 that introduced the project's objectives and sought to partner with organizations that shared similar objectives. Among other organizations, INGENAES found willing collaborators within the MoA and MFL, as well as faculty across the country's ten Agricultural Training Institutions (ATIs). These institutions and individuals identified agricultural extension services as a vehicle for sharing nutrition information with farming households and began identifying nutrition messages relevant to agricultural practices and products promoted in Zambia.

Initial collaboration between INGENAES and the MoA led to the development of key nutrition-sensitive agriculture messages that were included in the Agricultural Planning and Resource Guide for Extension Officers, a handbook distributed to the country's 1,700 extension officers. Prior to finalization, the messages were pre-tested with the MoA's Human Resources Development and Training Section, leading to the prioritization of five core messages, which align with GRZ priorities and global recommendations for improving nutrition through agriculture. Core messages focused on production diversity, protection of natural resources, processing, preservation and storage, dietary diversity, and women's empowerment.

Lecturers at the Natural Resources Development College (NRDC) were also eager to collaborate, proposing the development of a human nutrition module to be integrated into an existing rural sociology course, which all students, regardless of their field of study, are required to take. By including the nutrition module in this course, the NRDC acknowledged that their students – future agricultural extension workers – require basic nutrition knowledge and skills to help farmers understand the connections between food, agriculture and nutrition. The NRDC's vision of creating a brief module that could easily be integrated into the College's curriculum was embraced by the Ministry of Agriculture and the Ministry of Fisheries and Livestock. These ministries share administration of the ten ATIs in providing training for the attainment of certificates and diplomas in agriculture-related fields. With ministerial support, a nationwide effort to integrate nutrition content into each ATIs' curriculum began.



## Development of the Nutrition Module

With leadership from the MoA and the MFL, INGENAES and PEP II (2016-2021) collaborated with the ATIs to develop a human nutrition module that would fit into existing courses and would align with the tasks required of the ministries' agricultural EAS staff. The coordination process and module development were led by an INGENAES consultant with curriculum expertise who was based in Zambia.

The messages developed for the Agricultural Planning and Resource Guide for Extension Officers (above) were the result of a process that first identified core tasks expected of extension staff, existing guidance related to the promotion of food and nutrition, and guidelines developed and tested in other countries. Thus, these messages provided a foundation for the nutrition module content.

Also foundational to the module development process was an assessment of existing nutrition curricula at each of the ATIs. Conducted by PEP II with MoA and MFL staff, the assessment identified gaps in nutrition content across courses, identified courses in which ATIs could incorporate the nutrition module, and reviewed technical capacity of lecturers to deliver the proposed nutrition module.

During these foundational activities, partners agreed that nutrition content needed to be accurate, yet accessible to non-experts and relevant to the tasks expected of agricultural professionals. These principles guided the development of an outline for the human nutrition module, then the development of the complete module. The initial outline and draft modules were reviewed in consultation with a select group of nutrition stakeholders, including the National Food and Nutrition Commission (NFNC), MoA, MFL and other line ministries, the EU, and the NRDC's Food and Nutrition Department.

The final human nutrition module presented at the validation workshop (below) focused on three broad topics:

1. Nutrition Basics, describing different nutrients and their food sources, different types of malnutrition, causes and consequences of malnutrition, and the enabling environment in Zambia.
2. Agriculture, Food Systems and Human Nutrition, discussing the pathways between agriculture and nutrition and the relationship between food systems, diets and nutrition.
3. Taking Action for Food and Nutrition Security, introducing nutrition-sensitive agriculture actions and the agriculture sector's role alongside multiple sectors to advance nutrition outcomes.

## National Nutrition Module Validation Workshop

The human nutrition module was validated at a workshop that engaged senior representatives from the National Food and Nutrition Commission (NFNC), the EU, USAID, the MoA, MFL, and the Principals for each of the ATIs. Participants were led through the plan for the module and reacted to it by identifying aspects that were good, others that needed some modification, and finally those aspects that ought to be excluded. This feedback was incorporated in the development of a comprehensive module.

The complete human nutrition module includes the lecturer's guide and presentation and student workbook. The student workbook includes activities and case studies designed to supplement lectures and enhance student engagement in learning whether the student attends on-campus lectures or participates in open distance learning.

## Capacity Development and Training-of-Trainers

Twenty-six lecturers representing each of Zambia's ten ATIs participated in a three-day training of trainers' workshop in Lusaka. Lecturers provided feedback on the content and presentation of the material while considering how they would in turn incorporate the module into their respective curricula. Feedback was incorporated into the final version and disseminated to the ATIs by the MoA.

INGENAES supported two NRDC lecturers' participation in a two-week training at Wageningen University in order to equip them with expertise and confidence to be champions for integrating nutrition into ATI curricula. The decision to offer supplementary training to these lecturers stemmed from the assessment conducted at ATIs, in which principals and lecturers expressed concern about their capacity to teach the content. To address this concern, the MoA and MFL proposed to form a "mentor group" of nutrition champions who can provide the technical assistance required to ensure that every ATI is able to successfully integrate the module into the curricula. These lecturers are intended to be active champions in the mentor group.

## 2018 – Year of Implementation

The ten ATIs anticipate introducing the module into existing courses during the 2018 academic calendar. Prior to teaching the module, ATIs worked to identify the best fit for including the module in their curriculum, and advocated their respective administrations to achieve full buy-in. As of June 2018, the MoA and MFL were conducting visits to each ATI to confirm the process for integration of the human nutrition module and identify technical assistance needs. This will allow the ministries to tailor support to each ATI.

In the case of NRDC, as initially planned, the nutrition module will be embedded in a rural sociology course that is required of all students. The MoA and MFL fully support the integration of the human nutrition module into the coursework of the ATIs and, as mentioned above, propose forming a mentor group from amongst those trained in the ToT to provide ongoing technical assistance in supporting ATIs to roll-out the human nutrition module. The MoA is currently developing the terms of reference for the mentor group. The mentor group will continue to provide assistance to ATIs once the INGENAES and PEP II projects have concluded operations (2018 and 2021, respectively). Technical assistance may include re-orientation on the human nutrition module or co-facilitation of the module, depending on the needs or requests of the ATIs.

The MoA and MFL have also expressed a desire to evaluate student learning and also lecturers' experience instructing students using the human nutrition module. Such an evaluation would help the ministries adapt the content to enhance learning or facilitate instruction. The evaluation may also help the ministries understand how students apply learning in their careers as AEWs in Zambia. The evaluation has not yet been designed.

Following the completion of the human nutrition module, the MoA requested technical assistance from INGENAES and PEP II to review and update existing human food and nutrition courses associated with three agricultural college's certificate and diploma programs in sustainable agriculture. The full course will build upon the human nutrition module but provide more in-depth information on the connections between food, agriculture and nutrition, while also offering practicals for students to apply and demonstrate learning.

**Table 4 : Timeline of activities: the case of Zambia**

Date	Activity	Results
March 18, 2015	Stakeholder Prioritization Workshop Participants include NGO, government, and donor affiliates	<ul style="list-style-type: none"> <li>• Increased awareness of INGENAES project</li> <li>• Launched collaborations</li> <li>• Validated INGENAES work plan</li> </ul>
2015-2017	Joint activities conducted between MoA and INGENAES	<ul style="list-style-type: none"> <li>• “Key Messages” developed and included in PROGEO (distributed to 4,000 extension staff nationwide)</li> <li>• INGENAES supported revision of National Agricultural Extension and Advisory Services Strategy; gender and nutrition included as explicit objectives</li> </ul>
June 2016	Meetings among NRDC lecturers, INGENAES, EU staff meet	<ul style="list-style-type: none"> <li>• Identified the development of a nutrition module as an activity of shared interest</li> <li>• INGENAES, EU discussed respective funding commitments</li> </ul>
June 2017	MoA engaged	<ul style="list-style-type: none"> <li>• Scope of activity increased to include all ATIs</li> </ul>
July-September 2017	Content drafted	<ul style="list-style-type: none"> <li>• “Key Messages”, “Food and Nutrition Section Operational Guidelines”, and materials from other contexts consulted to develop content specific to the needs and tasks of Zambian agricultural extension staff</li> </ul>
September 12, 2017	Validation workshop	<ul style="list-style-type: none"> <li>• MoA and Ministry of Health (MoH) staff, INGENAES and PEP II affiliates, and Principals of each ATI provided buy-in, feedback to the module’s outline and formative content</li> </ul>
November 6-8, 2017	Training of Trainers	<ul style="list-style-type: none"> <li>• Two lecturers from each ATI were trained to implement the nutrition module and provided feedback related to the content</li> </ul>
November 2017	Wageningen Short Course	<ul style="list-style-type: none"> <li>• Two NRDC lecturers received advanced training in the form of a 2-week intensive, “Making Agriculture Work for Food and Nutrition Security”</li> </ul>
December 2017	Module finalization	<ul style="list-style-type: none"> <li>• Trainee feedback incorporated into final components of the module, comprised of a lecturer’s guide, student workbook, and PowerPoint presentation</li> </ul>
January to July 2018	Process of integration, implementation	<ul style="list-style-type: none"> <li>• Trained lecturers worked with principals, PEP II and MoA staff to identify appropriate courses for inclusion of module</li> <li>• Institutions began to deliver content</li> </ul>

## Case Study: India

This case of India depicts the main results of assessments that were conducted in view of defining nutrition module relevant for integration in the specific context of the state agricultural universities. The following outlines the main steps carried out by researchers to develop suggestions for locally-adapted nutrition modules.

### **Background: The national curricula revision and the SAFANSI opportunity**

In India, thirty years ago nutrition courses were integrated in the curricula of agricultural extension, but with the creation of a home economics program the nutrition courses were removed from the agricultural curriculum, building silos among field workers. It is once every five years that the curricula for agricultural programs is revised by the Indian Council for Agriculture Research (ICAR). When the World Bank-sponsored South Asia Food and Nutrition Security Initiative (SAFANSI) decided to undertake a study to introduce nutrition content into tertiary extension education, it happen to be the year of the curricula revision and thus an opportunity to re-integrate nutrition. The study focused on the case of state agricultural universities in Tamil Nadu, united Andhra Pradesh, and Bihar.

### **Assessment Agriculture-Nutrition Linkages in Agricultural EAS**

As a first exercise, Babu and colleagues (2016) conducted several discussions and interviews from 2010 to 2014 with farmers, their families, the agriculture EAWs and agriculture and nutrition program managers among others, in various part of India in order to: understand the landscape (main stakeholders, major issues, implementation process, etc.) of agricultural EAS in the country and to look for an entry point or an opportunity to effectively integrate nutrition goals into EAS.

Then, they carried-out face-to-face consultations with relevant ministry officials, faculty members, and program managers of nutrition interventions based on agriculture. This was followed by a training of faculty of SAUs and staff of relevant program managers to obtain feedback on the strategy for revising the curriculum.

### **Findings of the assessment**

Compared to the assessment conducted in other countries reviewed, the particularity of the India one was that it included a thorough mapping of the extension structure in India. It is an important step to identify all stakeholders involved in extension at national level and understand their specific roles, responsibilities and activities in the field. On other hand, the assessment identified specific criteria to determine the capacities needed by ATIs for the successful integration of nutrition in their agriculture education programs:

- Opportunities for integrating nutrition curriculum and the good practices followed by the faculty members and the extension systems into the agricultural education system
- Pathways for effectively transferring nutrition knowledge into EAS
- Specific programs for enhancing the capacity for nutrition extension
- Current capacities
- Future needs
- Existing gaps in universities and state agricultural departments for nutrition integration in training programs

- Opportunities for integrating cross-disciplinary levels at the district and state levels through collaboration among the ministries
- The role of EAS in reaching out to rural women

## National Workshop for Curricula Revision

In November 2014, a workshop was organized in New Delhi in collaboration with Digital Green to bring together agriculture and nutrition experts, program implementers, and policy makers to reflect on the findings of these studies and recommend ways to enhance the quality of nutrition-sensitive curricula in the university and extension systems. The workshop aimed at defining a strategy for capacity strengthening through revising the curriculum of extension education programs to increase nutrition-related content.

### Recommendations for curriculum revision

Regarding the process for revising curricula at national level, it is organized through a national dean's committee responsible for reporting to the Deputy Director General (Education) of ICAR. Under this committee, a nutrition task force was formed to undertake a needs assessment at the national level and to assess specific contextual needs and opportunities at the state level.

It determined that at the national level, ICAR, the National Academy of Agricultural Research Management, and the National Institute of Agricultural Extension Management (MANAGE) should be involved in the curriculum development to identify national nutrition challenges and curriculum needs. The course content and instructional methods should be developed by the faculties of agriculture and home sciences at SAUs and state ATMA offices. Comprehensive course content should be developed by universities for courses at the bachelor's, master's, and doctorate levels, and as continuing learning courses by state extension training centers. Next, the curriculum should be contextualized at the district level by the SAUs and KVKs to reflect local challenges. These institutions can connect the available courses and educational materials to problem solving at the district level. Block-level extension officers and those in the Farmer Friends program should then further contextualize the universal curriculum content with examples of block-level challenges and solutions.

Because nutrition challenges require multiple sectors to work together, the development of the curriculum to meet the knowledge needs of the extension professionals have to take a long-term perspective, looking ahead 5 to 10 years in terms of piloting to identify potential problems and solutions prior to large scale role-out. Discussion among state, district and block-level extension officials, KVK scientists, and SAU faculty members pointed toward the need for specific sets of modules to be developed for addressing nutrition as a development challenge. These modules should take into account issues related to nutrition problem identification, developing contextual solutions, implementing interventions, monitoring and evaluating the programs, and refining the nutrition programs and policies at the central and state levels.

### Recommended nutrition module in each SAU

Babu *et al.*, reviewed the curricula of three state agricultural universities and provided recommendations on the nutrition modules each should offer. For instance, at Andhra Pradesh state agricultural university, the extension curriculum is comprehensive in terms of agricultural aspects, but there is little to no nutrition-related content included. The recommendations made for curriculum revision are summarized in Table 5:



**Table 5 : Nutrition courses recommended for the Andhra Pradesh SAU**

	Under-graduate	Post-graduate	Rural Work Experience program	Diploma Training
Fundamentals of human nutrition	✓			
Nutrition problems identification and monitoring	✓			✓
Nutrition planning and programming	✓			
Evaluation of nutrition programs	✓			
Impact assessment of nutrition programs	✓			
Crop planning for nutritional outcomes	✓			
Nutrition planning and programming		✓		
Nutrition economics		✓		
Design agricultural system for diversified diet	✓	✓	✓	
Nutrition solution through agriculture and crop planning				✓
Monitoring and evaluation of nutrition interventions				✓
Practical nutrition-oriented activities			✓	

Similar recommendations based on the specificity of each of the two other SAUs (Tamil Nadu and Bihar State) were made.

## Implementation

The previous curricula revision took into account to some extent the recommendations made by Babu and colleagues. And some nutrition content is being offered in the SAUs.

## Key Steps for Successful Nutrition Integration in Agriculture Extension Curriculum

The experiences detailed above point to key steps and enabling factors that contributed to successful nutrition integration. It is important to note that the order of the steps presented here are not immutable.

### Window of opportunity

The first criteria that seemed to be common to the country case studies, was that they all benefited from an opportunity. They capitalized either on a new project starting in the country such as in Burkina Faso, Ethiopia and India or on the SUN movement platform and the INGENAES project in Zambia.

### Enabling political environment

The support from policy makers is critical in order to mobilize resources needed in reviewing the curricula. As presented in the case from Burkina Faso, the country had already taken a strong political position in making agriculture work for nutrition in the country. In Ethiopia and Zambia, political will was demonstrated through commitment to the SUN movement.

### Step 1: Establishing a work group

Common amongst case studies reviewed was a dedicated working group formed to ensure development, delivery and implementation of the nutrition content. For instance, in Burkina Faso it was called the pedagogical committee, the mentor group in Zambia and in India the nutrition taskforce. The role of the work group is to guide and supervise the entire process from initial needs assessment to the effective nutrition content integration in the curricula and the continued technical assistance and orientation needed for the smooth roll-out of the course.

### Step 2: Assessing learning needs

One of the most critical step in the process of nutrition course integration in curricula of ATIs is the LNA. The LNA is required to ensure that the content of the learning initiative adequately targets the needs of the agricultural EAWs and enhances their capacities to achieve their responsibilities and carry their activities. The table 6 summarises the main focus each country used when carrying their LNA.

**Table 6 : Areas of focus across country learning needs assessments**

	Burkina Faso	Ethiopia	Zambia	India
Define the objectives of the curricula revision and how they relate to the EAWs functions	✓	✓	✓	✓
Comprehensive understanding of the agricultural extension sector and structure as well as decision-making process for curricula revision in the country	✓	✓	✓	✓
Understanding the national nutrition challenges	✓	✓	✓	✓
Identify activities regularly conducted by EAWs	✓	✓	✓	✓
Identify the current set of trainings offered to EAWs by all post-secondary ATIs (public and private)	✓	✓	✓	✓

	Burkina Faso	Ethiopia	Zambia	India
Define the gap between activities conducted by EAWs and training offered by post-secondary ATIs	✓	✓	✓	✓
Identify the capacities needed by ATIs	✓	✓	✓	
Identify the opportunities and obstacles that exists regarding the integration strategy	✓		✓	
Identify the follow-up support needed to ensure sustainability of the integration of the nutrition course	✓		✓	
Develop the nutrition course	✓	✓	✓	

NB: the empty cases mean that either the country LNA didn't focus on the specific area or the information regarding the specific area was missing/not communicated when developing this paper.

### Step 3: Developing the nutrition content

Based on the LNA findings, the taskforce team will be in position to develop nutrition content that will fit the capacity of the agricultural post-secondary training institutions and the need of the EAWs. The approach to content development will vary from one country to another. For instance, in Burkina Faso, the content was developed by the work group (table 7), while in Zambia it was developed by a consultant who collaborated with a work group. In the cases presented, nutrition content developed included both stand-alone nutrition course (like in Burkina Faso, see table 7 below) and nutrition module incorporated in agricultural course (like in Zambia).

**Table 7 : Time allocation and teaching method by module of the nutrition course**

Nutrition course modules	Hours for theory classes	Hours for tutorial classes	Hours for field activities	Total
Module 1: Food, Nutrients	03	0	0	03
Module 2: Food needs and balance	03	03	0	06
Module 3: Nutritional status	06	03	04	13
Module 4: Hygiene and food safety	03	0	06	09
Module 5: Food and nutrition security	02	0	0	02
Module 6: Nutrition Education	06	06	02	14
Module 7: Nutrition policies and programs in Burkina Faso	01	0	0	01
Total hours	<b>24</b>	<b>12</b>	<b>12</b>	<b>48</b>

#### Step 4: Revising curricula

In all the cases presented, the curricula revision and validation was done through a consultative process where the possibilities for the revision were discussed among members of academia, relevant ministries or government bodies and students' association.

#### Step 5: Validating with stakeholders

This step represents the external validation and harmonization phase. It means that the curricula reform is presented to a larger group of stakeholders and government ministries (not directly related), students' association etc. It is the last stage before the actual integration of nutrition in the curricula and the implementation of the new curricula and the taking of courses by students.

#### Step 6: Implementing the integration

Finally, ATIs offer training in nutrition wherein students are trained in nutrition as a part of their agricultural training program, and instructors receive ongoing support as they roll-out courses for the first time.

#### Step 7: Monitoring and evaluation mechanism

Because most of the cases presented are at their early stage, none of them have conducted an evaluation yet, except Ethiopia (and the experience from CAP Matourkou in Burkina Faso). Unfortunately, a problem is that the monitoring mechanism of these initiatives were not documented; therefore, it will again be challenging to collect evidence on this matter.

**Table 8 : Steps followed by each country in their integration process**

	Burkina Faso	Ethiopia	Zambia	India
Benefited from a window of opportunity	✓	✓	✓	✓
Benefited from a positive political environment	✓	✓	✓	✓
Step 1 – Established a work group	✓	✓		✓
Step 2 – Assessed learning needs	✓	✓		✓
Step 3 – Developed nutrition content	✓	✓	✓	
Step 4 – Revised curricula	✓	✓	✓	✓
Step 5 – Validated with stakeholders	✓	✓	✓	✓
Step 6 – Implemented the integration	✓	✓	✓	
Step 7 – Set up a Monitoring and evaluation mechanism		✓		

## Conclusion and Way Forward

Despite geographical diversity (Asia, East Africa, South Africa and West Africa) and differences among the nutritional challenges encountered, it was still possible to identify commonalities in the process each country underwent to integrate a nutrition course in the curricula of ATIs.

Today, EAWs are expected to help farmers respond to a range of new challenges, such as climate change, and to advise on new farming approaches, such as nutrition-sensitive agriculture and sustainable intensification (FAO, 2017). Therefore, in the past years they have been more perceived as a privileged way to reach smallholders farmers on issues other than productivity increase and technology knowledge transfer. Probably because of this relatively new trend, there are not many documented interventions on the integration of nutrition in agricultural EAS in general and even less on the integration of nutrition course in post-secondary ATIs. There is a great need to emphasize on the importance of conducting more interventions to develop the nutrition capacities of agricultural EAWs especially in pre-service. The agricultural EAS training as it is today does not prepare the future AEWs to tackle the new challenges the rural world is facing, e.g. climate change and increasing malnutrition issues. It is essential to bring closer the faculty of nutrition and food sciences with the faculty of agriculture studies. In most training institutions where agricultural training is offered there is a nutrition and food sciences department, but they do not interact with one another. By breaking the silos between the two at institutional level, the challenge of finding human resources able to teach the nutrition course to agricultural students could be overcome.

Last but not least, the absence of baseline studies and SMART nutrition indicators are all barriers to obtaining evidence on the impact on nutrition conditions of farmers. All interventions should pay particular attention to these aspects in order to contribute to improving knowledge on the integration of nutrition into agricultural extension services.

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## Annex I: Key recommendations for integrating nutrition contents in agricultural training institutions

### Important pre-existing conditions

- **Window of opportunity:** consist of using nutrition initiatives, programs or projects happening either at international, regional, national or institutional level as a lever for advocating in favor of nutrition integration in agricultural training institutions.
- **Enabling political environment:** represent the degree to which a government is committed to make agriculture work for nutrition, translated by nutrition-sensitive policies. Getting the policy-makers and nutrition champions support can be critical to mobilize resources and positively influence head of ATIs. It is important to involve them at the earliest stage possible.

### Major steps for successful integration

1. **Establish a work group** composed of relevant stakeholders for the integration process. The work group role is to guide the entire process from the LNA to the effective nutrition content integration in the curricula. In case the work group doesn't have nutrition skills to achieve its objective and conduct the LNA, they could either recruit a consultant or be supported by technical and financial partners (international non-governmental organizations, united nations agencies, etc.). The group could also benefit from a training to develop nutrition capacities of its member.
2. **Assess learning needs:** though different in each country, the learning need assessment forms a critical part of the process, since it will guide the following steps. The LNA should collect information on:
  - the objective the curricula revision is intended to address and the way these objectives relate to the EAWs functions;
  - a comprehensive understanding of the agricultural sector in the country, understand the nutrition challenges in the local context;
  - the activities regularly conducted by EAWs;
  - the current set of trainings offered to EAWs by all post-secondary ATIs (public and private), because, the knowledge and experience EAWs already have will affect the content and the delivery method of the nutrition course;
  - the gap between activities conducted by EAWs and training offered by post-secondary ATIs;
  - the capacities needed by training institutions in order to offer and integrate nutrition course;
  - the decision-making process for curricula revision;
  - the opportunities and obstacles that exists regarding the integration strategy.
  - the follow-up support needed to ensure sustainability of the integration of the nutrition course.
  - the development of the nutrition course

In most cases, at the end of the LNA a workshop is organized to share findings with stakeholders and make sure that all actors have the same understanding of the situation. It is only after this descriptive analysis that solutions for resources could be found. The assessment could be the opportunity for an advocacy with government, private sector, funding institutions etc.

3. **Develop nutrition content:** Whether it is a stand-alone nutrition course or a nutrition chapter, module or unit in an agricultural course, the nutrition content will be developed based on the findings

from the LNA. It is recommended to involve stakeholders at the beginning to foster the sense of ownership of the process and results. The nutrition content is developed based on the educational system in place, with identified number of credits, hours required both for students and professors for each module, etc.

4. **Revise curriculum:** Often through a several-day workshop where questions related to the level, degree, teaching methods etc. are agreed upon. In other words, it is the institutional or internal agreement phase.
5. **Validate with stakeholders:** This step represents the external validation and harmonization phase. It means that the curricula reform is presented to a larger group of stakeholders and government ministries (not directly related), students' association etc. It is the last stage before the actual integration of nutrition in the curricula and the implementation of the new curricula and the taking of courses by students.
6. **Implement the integrated nutrition content:** Finally, ATIs offer training in nutrition and not only students can be trained in nutrition as part of their agricultural training program, but also professors receive on-going support as they roll-out courses for the first time.
7. **Monitor and evaluate:** An essential step to provide evidence on the relevance of offering nutrition training to agricultural extension students and document the impact of the integration in the productivity and livelihoods of farmers and rural workers. In other words, conducting baseline/endline studies and impact evaluation is important.

## Annex 2: List of relevant materials

- Module on Nutrition as Part of the New Extensionist Learning Kit. Available at :  
<https://www.g-fras.org/en/knowledge/new-extensionist-learning-kit-nelk.html> and  
<https://ingenaes.illinois.edu/new-extensionist-nutrition-module-is-out>
- The ENACT course in nutrition education. Available at :  
[www.fao.org/nutrition/education/professional-training/enact/en](http://www.fao.org/nutrition/education/professional-training/enact/en)



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